

Final Exam, SØK2010 Banking

Fall 2023

Please answer your answers clearly and show your steps to receive partial credit. Final answers without discussions will not receive credit.

Question 1 (25 points)

1. What problems does “asymmetry of information” create in the loan market? Can banks help to reduce the impact of this problem?
2. What is the difference between a bank that is insolvent and one that is illiquid?
3. What is the link between the safety net provided by the government to the banking system and the relatively heavy regulation of the same industry by the government?

Question 2 (25 points)

Consider a two-period economy, in which the agent has preference described by $u(c_1, c_2) = \log c_1 + 0.9 \log c_2$, where c_1 and c_2 are consumption in the each period respectively. u is strictly increasing and concave. The agent has income $y_1 = 2$ in the first period and $y_2 = 1$ in the second. Assume there is no transaction cost in the financial market, and the agent optimizes his utility through borrowing or lending in the first period, and repaying or getting paid back at the gross interest rate of $r = 1.25$ in the second period.

1. Write down the optimization problem of the agent. Solve the optimal borrowing or lending decision.
2. Solve the agent's optimal consumption in both periods.
3. Is the agent better off with the financial market compared to without the financial market? Explain.
4. Now assume that the financial market is not perfect, and the borrowing rate $r_b = 1.25$ is bigger than the saving rate $r_s = 1.15$. What is the agent's optimal behavior now: will he borrow or lend?
5. Show that transaction costs reduce the utility of the agent.

Question 3 (25 points)

Let's take a closer look at the simple model of "liquidity insurance" presented in "Banks and Liquidity Creation: A Simple Exposition of the Diamond-Dybvig Model" and sketched in class. Following Diamond, let's use the utility function $u(c) = 1 - \frac{1}{c}$, and let's assume the probability of a consumer having to withdraw her money after only one period is $\frac{1}{4}$, with probability $\frac{3}{4}$ she can leave the funds in the investment for the full two periods. She earns a return of 1 if the funds are withdrawn after one period, and 2 if they are invested for two periods.

1. Find consumers' expected utility in the scenario where they enjoy $u(1)$ with probability $\frac{1}{4}$ and $u(2)$ with probability $\frac{3}{4}$.
2. Now assume an intermediary, call it a "bank", pays depositors the same amount of money *regardless* of whether the funds are left for one or two periods (this assumption is a little strange, but it makes things simple). Determine the amount the bank has to pay in order to make the consumers *just as well off* as they would have been in part (1).
3. Find the bank's expected profits if it pays the amount determined in part (2), and determine the maximum share of depositors that could demand their money after one period without making the bank insolvent.
4. Now suppose increased competition forces the bank to pay 1.7 to depositors, instead of what you got in (2). Find the bank's profits, and the maximum share of "early withdrawals" the bank could sustain without becoming insolvent.
5. Do you think it's reasonable to assume that depositors' liquidity demands are independent—that is, that the probability of any given depositor coming in for her funds does not depend on whether other depositors are coming in for their funds? Explain. Intuitively, what effect would the failure of this assumption have on the probability of insolvency?

Question 4 (25 points)

Assets		Liabilities and Equity	
Cash and due from banks	9000	Demand deposits	19000
Investment securities	23000	Term deposits	89000
Repurchase agreements	42000	Retail CDs	28000
Loans	90000	Debentures	19000
Fixed assets	15000	Total liabilities	155000
Other assets	4000	Common stock	12000
		Paid-in capital	4000
		Retained earnings	12000
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Total assets	183000	Total liabilities/equity	183000

Income statement

Interest on loans	9000
Interest on investment securities	4000
Interest on REPOs	6000
Interest on bank deposits	1000
Total interest income	20000
Interest on deposits	9000
Interest on debentures	2000
Total interest expense	11000
Net interest income	9000
Provision for loan losses	2000
Noninterest income	2000
Noninterest expenses	1000
Income before taxes	8000
Taxes	3000
Net income	5000

A bank's balance sheet and income statement are given. Based on the given information, calculate the quantities in 1)-4).

1. Return on equity
2. Return on assets
3. Equity multiplier
4. Net interest margin